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RESEARCH ARTICLE

Quality of life of patients with lower jaw benign tumor post resection and mandibular reconstruction

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ABSTRACT

The quality of life of patients becomes an essential part of the success of an intervention since it is used as an outcome measure. Mandible resection will cause discontinuities that can degrade the quality of life of patients. Extensive resection and reconstruction will affect the quality of life of patients after resection and reconstruction surgery as compared with that before the surgery. On this basis, cross-sectional study was conducted among 27 patients suffering from benign mandibular tumors undergoing surgical procedure of marginal resection, segmental resection, or hemimandibulectomy at Dr. Sardjito general hospital in 2010-2015. Quality of life of patients after mandibular resection and reconstruction was measured with modified oral health impact profile (OHIP-14). An assessment of the quality of life before and after surgery was based on gender and type of reconstruction and it was analyzed using t-test and one-way ANOVA. It was revealed that the quality of life of patients with benign tumors increased significantly (p=0,000), and that gender differences did not significantly affect the improved quality of life (p=0.433). The mean score of patient's quality of life was highest on the type of marginal resection (mean value =14.50), and the lowest was on segmental resection (mean value=7.50), but the type of resection did not significantly influence the improved quality of life (p=0.152). Resection and reconstruction procedures under taken by Oral and Maxillofacial Surgeon at Dr. Sardjito general hospital can improve the quality of life of patients with benign tumors of the lower jaw.

Keywords: jaw tumor; mandible resection and reconstruction; quality of life

INTRODUCTION

The high prevalence of benign tumors, especially ameloblastoma in the jawbone requires specific treatment.[1] Resection on the jawbone is the recommended treatment to remove the jaw tumor, especially for cases of large benign tumors. The lesion may expand to a large area that leads to disconnection of the jaw continuity, even penetrating the bone and merging with the surrounding soft tissues.[2] In this case, it is necessary to perform resection of the jawbone as a radical surgery to take the tumor entirely by including the surrounding healthy tissue of about 1-1.5 cm. However, the surgical treatment of jaw bone cutting could have an impact on the loss of continuity of the jaw bone, which thus requires reconstruction procedure.[3]

Proper reconstruction can restore the mandibular arch to support occlusion with the maxilla, for cosmetic purposes, and to keep the competency of oral cavity for speech, swallowing, mastication and for affecting the quality of life.[4] Although the contours of the mandible can be repaired with a titanium bridging plate, the restoration of occlusion and mastication function sometimes come up with unsatisfactory result, which may affect the quality of life of the patient.[5]

Quality of life is the individual's perception of their position in life and a measurement that accommodates many variables including the patient's feelings, satisfaction, and the function of the currently affected organs as compared to ideal conditions. Quality of life can help clinicians obtain

information on the outcomes of care and determine the prognosis of a surgical procedure.[6]

Segmental resection and mandibular reconstruction are routine procedures performed in the Department of Oral and Maxillofacial Surgery of Dr. Sardjito Hospital Yogyakarta. Data jaw-related surgical procedure in this hospital is included in the top 10 most treatments. Clinical evaluation was done on patients after segmental resection at the oral surgery clinic by Trimiastuti from 1999 to 2009. However, assessment of the quality of life in patients before and after resection and reconstruction of the mandible with bridging plate on benign jaw tumors is currently unreported.

On this basis, we studied the difference in the quality of life in patients before -after resection and the immediate reconstruction procedure of mandible with bridging plate in benign jaw tumors performed in the Oral and Maxillofacial Surgery Department of Dr. Sardjito Hospital Yogyakarta between 2010 and 2015.

MATERIALS AND METHODS

A cross-sectional study approach was conducted on 27 patients suffering from benign tumors of both the odontogenic and nonodontogenic tumors having performed surgical resection marginal/ en bloc, segmental, and hemimandibulectomy in Dr. Sardjito general hospital Yogyakarta in 2010-2015. The inclusion criteria of this study were male and female patients of 20 years old and above with benign tumors in the mandibular bone, having performed marginal/en bloc, segmental, and hemimandibulectomy resection surgery. The Exclusion criteria of this study were patients with benign tumors in the upper jaw, suffering from the systemic disease: diabetes mellitus, chronic hepatitis, immunodeficiency, and blood disorders.

The sample size was determined using the rule of thumb of ten subjects for each independent variable.[7] Since there were three independent variables (one influence variable and two covariates), the study needed 30 patients undergoing resection and reconstruction of the mandible. The research sampling of the subjects was conducted on a consecutive basis to patients who meet the inclusion and exclusion criteria (eligibility criteria).

To measure the quality of life of patient post-resection and reconstruction of the mandible, the researcher used a modified oral health impact profile (OHIP-14). Modified OHIP-14 was done by changing the verbal question into a statement, to distinguish the quality of life of patients before and after surgery.[8]

This research was conducted over for three months. Patients who have undergone mandibular bone resection and mandibular bone reconstruction have been recalled for evaluation. The letter was sent to all of these patients for assessment, and an examination was made regarding the results of the operation and evaluation of the quality of life of the patient.

The patient examination was carried out at Dr. Sardjito general hospital and Prof Soedomo dental hospital. Twenty-seven patients were present during this period. The patient then evaluated their quality of his life by filling out a questionnaire before and after surgery, by checking the most appropriate statement to the patient's condition. Patients were given an explanation and procedures for filling out the quality of life questionnaire with the modified (OHIP-14) instrument.

Data obtained from the OHIP-14 questionnaire (Likert scale data) included interval scale data to be analyzed quantitatively.[9] Numerical data analysis was conducted using mean, median, standard deviation, minimum and maximum values with 95% confidence interval mean. Before conducting further data analysis, the normality test was performed on the numerical data by the Shapiro-Wilk test. If the data were normally distributed, the bivariate parametric study was conducted with the t-test and one-way ANOVA test. Categorical data analysis was assessed by the number and percentage of each group.

This study used the paired t-test as a parametric analysis to examine differences in quality of life before and after surgery, differences between sex and quality of life before and after surgery, analysis of differences in values of improvement in quality of life, and differences between each

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surgical action and quality of life before and after resection.

One way-ANOVA test was used to determine differences in types of resection measures to improve patient quality of life, before and after surgery. Before the analysis, the data were tested to measure data normality with the Shapiro-Wilk test. Normality tests using Shapiro-Wilk (n<50) obtained p value >0.05 for both quality of life before surgery, after surgery and difference in the improvement of quality of life. This result indicated that the data were normally distributed and allowed the use of parametric analysis. Parametric analysis with a t-test was done to determine differences in quality of life before and after surgery, quality of life before and after surgery for each sex, and to test differences or improvement in the quality of life-based on sex. This research has been approved by the Ethics and Advocacy Commission of the Faculty of Dentistry, Universitas Gadjah Mada based on the ethical permission Number 00753 / KKEP / FKG-UGM / EC / 2016.

RESULTS

Data obtained from 27 present respondents demonstrated that the average age of the subjects was 41.04 years with an age range of 25-68 years old. Most subjects were women with as many as 15 respondents (55.6%). The most widely used type of resection was hemimandibulectomy with 11 surgeries (40.7%), and the most type of tumors was ameloblastoma with 24 cases (88.9%) (Tables 1 and 2).

The validity test results in table 3 show that the r value for all questionnaire instruments is more than 0.3 and the p-value is less than 0.05. These results indicate that the OHIP-14 modification of the questionnaire instrument is valid. Reliability test results are seen from the value of Cronbach's Alpha. The value of the Cronbach's Alpha value of >0.6 indicated that the questionnaire question was a reliable measurement had excellent reliability. The reliability test results of the OHIP-14 modification questionnaire showed that the results of Cronbach's Alpha-were 0.860.

The average quality of life of patients before surgery was 37.11, and it gradually increased after surgery, amounting to 47.85. The increase was significant, as shown by the p value of = 0.000 (p<0.005) (Table 4). The average quality of life of male patients increased from 37.00 to 48.85, and the increase was significant as indicated by p = 0.000. Likewise, the average quality of life of female patients increased from 37.20 to 47.27, and the increase was significant as indicated by p = 0.000. The mean difference/improvement in the quality of life in male patients (11.58) was higher than that of females (9.40), but there were no significant differences between the two, which meant that the sex did not significantly affect the improvement of quality of life p = 0.433 (p>0.05) (Table 5).

Tables 6 and 7 showed that the average quality of life of patients in the marginal resection surgery group rose from 37.50 to 52.00 after surgery. This data indicated a significant increase, as revealed by the p value of = 0.000 (p<0.05). The average quality of life of patients in the segmental surgery group went up from 39.20 to 46.70 after surgery, and the increase was significant, as indicated by the p value of = 0.021 (p<0.05). The average quality of life of patients in the hemimandibulectomy surgery group rose from 35.00 to 46.64 after surgery, indicating a significant rise as shown by the p-value of = 0.000 (p<0.05). The results of the ANOVA test analysis showed that the average improvement in the highest quality of life of patients in the type of marginal surgery was 14.50, and the lowest in segmental surgery was 7.50, but there were no significant differences between the two. In other words, the type of resection did not affect the improvement of quality of life significantly as revealed by the p value of = 0.152 (p>0.05).

Table 1. The results of the analysis of respondents based on age

Variable	Mean	Median	Highest	Lowest	SD
Age	41.4	44.0	68	25	13.175

DISCUSSION

The results of the study showed an improvement in the quality of life of patients after surgery for

Table 2. Frequency distribution of the types of surgical resection

Variable	Category	Frequency	Percentage
Sex	Male	12	44.4%
	Female	15	55.6%
Types of surgical resection	Marginal	6	22.2%
	Segmental	10	37.0%
	Hemimandibulectomy	11	40.7%
Type of Tumor	Ameloblastoma	24	88.9%
	Ameloblastic Ca	1	3.7%
	Mixoma odontogenic	2	7.4%

Table 3. Modification of OHIP-14 instrument validity test results

Statement	1	2	3	4	5	6	7	8	9	10	11	12	13	14
r value	.672	.454	.729	.71 9	.635	.423	.587	.704	.857	.567	.435	.432	.701	.531
p value	.000	.017	.000	.000	.000	.028	.001	.000	.000	.002	.023	.025	.000	.004

(r>0.3) and p=0.000 (p<0.05) valid

Table 4. T-test result of quality of life before and after surgery

Variable	n	Mean	SD	p
QoL before surgery	27	37.11	0.229	0.000
QoL after surgery	27	47.85	0.061	

Sig. p>0.05

Table 5. Difference between quality of life before and after surgery and difference/increase based on each sex

Variable	n	Mean	SD	p
Male QoL before surgery	12	37.00	8.560	0.000
Male QoL after surgery	12	48.58	3.825	
Female QoL before surgery	15	37.20	8.521	0.000
Female QoL after surgery	15	47.27	9.543	
Difference-Male	12	11.58	8.051	0.433
Difference-Female	15	9.40	6.185	

Sig. p>0.05

Table 6. Difference between quality of life before and after surgery and difference/increase per type of surgery

Variable	n	Mean	SD	p
Marginal- QoL before surgery	6	37.50	4.970	0.000
Marginal- QoL after surgery	6	52.00	3.633	
Segmental- QoL before surgery	10	39.20	10.185	0.021
Segmental-QoL after surgery	10	46.70	11.086	
Hemimandibulectomy-QoL before surgery	11	35.00	8.198	0.000
Hemimandibulectomy-QoL after surgery	11	46.64	3.776	

Sig. p>0.05

Table 7. ANOVA test results in differences between quality of life based on types of surgery

Variable	n	Mean	SD	p
Improved QoL post op- Marginal	6	14.50	4.183	
Improved QoL post op-Segmental	10	7.50	8.515	0.152
Improved QoL post op- Hemimandibulectomy	11	10.73	5.951	

Sig. p>0.05

removal of the jaw tumor in each surgical procedure. Post-surgical removal of the tumor is always followed by a reconstruction procedure using a bridging plate, titanium mesh, or reconstruction with miniplate with the addition of a non-vascularized autologous graft from the iliac bone.

Over time, the patient is likely to get used to his condition and lead a better life despite the physical difficulties and anxieties that might be psychologically disturbing. The excellent outcome of proper surgical removal of jaw tumors will inevitably lead to the same level of improved quality of life for both men and women. This result is in contrast to that revealed by Young et al. that men tend to achieve a higher level of quality of life after surgery than that achieved by women. This condition is presumably attributed to men's ignorance about their long-term physical pain after surgery as compared to women who tend to take notice of anything that changes, especially when it comes to their physical appearance.[6] Therefore, it is essential to have a further investigation on patient's ability to chew and to swallow, and their perception of pain, activity, mood, and anxiety.

This study shows that, on average, men scored higher for the improved quality of life than women, although the result is not significantly different. Men who tend to take a little notice about physical pain after surgery will only visit the hospital when they suffer from more severe conditions than those suffered by women. However, further study is still required about the initial state of patients based on the assessment on their physical appearance of the face and from radiographic images.

OHIP-14 consists of seven domains, namely: (1) functional limitations, (2) physical pain, (3) psychological stress, (4) physical disability, (5) mental disability, (6) social disability, and (7) obstacles.[10] Each domain has two questions with two methods of scoring the measurement. The first method is by making adjustments, i.e., each domain gets a maximum score of 4 resulting in the total score of 28.[11] The second method is done without adjusting, i.e. each question gets a score of 4, and thus making the total score of 56.[12]

Patients' ability to talk and taste food by their tongue despite the physical pain caused by their tumor in the oral cavity area indicates that they can tolerate the jaw tumor as shown by the ability to speak. In contrast, patients who often suffer from speech difficulties due to the larger lesion expansion of jaw tumor that forces the tongue leading to obstruction of speech articulation certainly require correction by way of resection and mandibular reconstruction. The insistence of tumors on peripheral nerves around it or the formation of an ulcer due to bite trauma may lead to severe pain. The dental occlusion and tooth loss resulted from the great size attainment of the tumor may lead to swallowing and chewing problems.[13] In general, most patients realized that the problems they have in the mouth and jaw joints are caused by jaw tumors.

Such problems in the oral cavity sometimes led to tension, embarrassment, and unpleasant condition, but most patients rarely expressed their anger about the pain. Patients revealed chewing and swallowing problems when eating. Food intake was commonly unsatisfactory, but patients rarely stopped from chewing and swallowing despite the problems in the oral cavity and jaw joints.[8,14] In contrast to chewing and swallowing, most patients found almost no problem with their daily activities since the tumor did not impede their physical activities; this is presumably attributed to the fact that the patients' daily activities did not require excessive talking.

Young et al. demonstrated that the type of resection showed several implications, especially in resection surgery involving the angle of the mandible and the area of the symphysis. Both operations have the worst effects on appearance and mostly damage the quality of life of the patient. Resection involving the area of symphysis will affect the appearance, digestion, and support of the lips against the face.[6]

In this line, patients suffering from benign tumors who opted to have resection and reconstruction surgery showed significantly improved results after having marginal, segmental, and hemimandibulectomy surgery. The excellent

outcome of the surgery, regardless of the type, improves the quality of life of patients with benign tumors. The presence of a jaw tumor is perceived to reduce the quality of life, so it is necessary to educate the public regarding the importance of prevention and appropriate rehabilitation measures in the case of a jaw tumor.[14]

CONCLUSION

This study concludes that resection and reconstruction surgery carried out by the Oral and Maxillofacial surgeon at Dr. Sardjito Hospital can improve the quality of life of patients with benign mandibular tumors. Each surgical procedure, regardless of the types of resection, leads to the improvement of the quality of life as compared to the condition before surgery. It is recommended that further research study the influence of the benign mandibular tumor severity based on its location and size on the quality of life of the patients, as well as the effect of the tumor on the stomatognathic functional outcomes of patients after having a benign mandibular tumor surgery.

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